

REMARKS

This amendment is in response to a non-final Office action (Paper No. 7) dated May 10, 2002. Upon entry of this amendment, claims 1-20 will be pending in this application. Applicant has amended claims 4, 6 and 7 by this amendment and has newly added claims 19 and 20 by this amendment.

The Examiner has objected to the specification in Paper No. 7 because of an allegation that the subject matter of allowed claim 8 is not found in the specification. Applicant has amended paragraph 0021 of the specification to overcome this objection.

The Examiner has rejected claims 1-4 under 35 U.S.C. § 102 (b) as being anticipated by newly cited Grange *et al.*, U.S. Patent No. 5,388,997. Applicant respectfully traverses this rejection.

Grange '997 pertains to a system for electrically connecting a second inflexible circuit 12 to a first inflexible circuit 14 while overcoming the problem of "nonlinear deflection". Grange '997 accomplishes this by using a rigid conductor 30 attached to a compressive conductor member (coil spring) 20. A second end of the rigid conductor 30 is electrically connected to the second circuit 12 and the first end of the rigid conductor 30 is electrically connected to the first end 22 of a compressive conductor 20. The second end 24 of the compressive conductor 20 is connected to said first circuit 14. Grange '997 attaches the coil spring 20 to the rigid conductor

30 by using intermediate section 46.

Applicant's invention pertains to a method and apparatus for electrically connecting a plurality of contact portions 12 on an ink cartridge 10 with a plurality of corresponding contacts on a printed circuit board 124. Contact is made through a plurality of spring elastic members 130. A single spring elastic member 130 electrically connects a contact on the printed circuit board 124 to a contact portion 12 on an ink cartridge 10. Each spring elastic member 130 is a single integrated monolithic unit and directly contacts both the contact portion 12 of ink cartridge 10 and a contact on the printed circuit board 124. Applicant's invention pertains to a plurality of elastic spring members that are stored within spaces within a nonconducting housing 140. The housing 140 maintains the elastic force of each elastic member 130 while physically and electrically isolating each elastic member 130 from each other. Applicant's invention seeks to improve the consistency of elasticity of each member 130 so that the force or compression applied to one elastic member does not influence the force or compression or the quality of electrical contact of adjacent elastic members.

Regarding the rejection of independent claim 1, Applicant submits that Applicant claims a *plurality* of elastic spring members. Grange '997 contemplates only a single electric connector. Applicant submits that there is no evidence in Grange '997 that the apparatus in Grange '997 could or would work to form a plurality of connections between a plurality of contact portions of an ink cartridge and a printed circuit board on a carriage of a printer. Furthermore, Applicant's

apparatus teaches each one of the pluralities of elastic connectors is electrically and physically isolated from adjacent elastic connectors. Applicant submits that the design of Grange '997 do not demonstrate the interaction between neighboring elastic connectors if a plurality of connectors were to be employed in Grange '997. Furthermore, Grange '997 does not demonstrate that the elastic connection disclosed of Grange '997 could be employed in the ink jet printer arrangement of Applicant's invention where a plurality of elastic connectors placed close to one another are required for improved operation. Therefore, Applicant submits that Grange '997 does not demonstrate Applicant's claim 1.

Furthermore, Applicant claims in claim 1 that each elastic member is "formed from an integral elongated member having a bent portion". In contradistinction, Grange '997 teaches that coil 20 must be used with rigid conductor 30 and intermediate portion 46 to electrically connect circuit 14 with circuit 12. Applicant therefore submits that the apparatus of Grange '997 is not "an integral member having a bent portion". Instead, Applicant submits that the apparatus of Grange '997 is a coil 20 joined with a rigid conductive member 30 by an intermediate section 46. Applicant again submits that Grange '997 fails to meet the claim language of Applicant's independent claim 1.

Furthermore, Applicant claims in claim 1 that each elastic member "forms electrical contact with a corresponding one of said plurality of said first contact portions of said ink cartridge" while also claiming that each elastic member comprises "a base having one end

electrically connected to a corresponding one of said plurality of second contact portions” where the electrically conductive second contact portions are defined to be on a printed circuit board on the carrier. In other words, Applicant claims in claim 1 that each elastic member forms contact with *both* a contact on an ink cartridge and a contact on a printed circuit board on a carrier. Meanwhile, in Grange ‘997, coil 20 forms electrical contact with circuit 12 through intermediate section 46 and through rigid conductive member 30. Therefore, Applicant submits that since coil 20 of Grange ‘997 does not form contact with circuit 12, Applicant’s claim 1 is again distinguished from Grange ‘997. Furthermore, the design claimed in Applicant’s claim 1 is advantageous over Grange ‘997 because fewer parts are needed and hence simplicity is improved and cost of manufacture is reduced.

Regarding the rejection of claim 2, Applicant submits that housing 140 in claim 2 maintains elastic force between third contact 132 and base 131 of each elastic member 130. The Examiner equates base member 52 of Grange ‘997 with Applicant’s housing 140. However, Grange ‘997 fails to demonstrate that base member 52 maintains elastic force between first end 22 of coil 20 and second end 24 of coil 20 in Grange ‘997. Furthermore, Applicant submits that Grange ‘997 fails to demonstrate that base member 52 operates on a *plurality* of coils 20 in addition to maintaining elastic force in *each* coil. Removal of the 35 U.S.C. § 102 (b) rejection on Applicant’s claim 2 is respectfully requested.

Regarding the rejection of claim 3, the Examiner states in Paper No. 7 that “said housing

comprising a plurality of windows (62) exposing respective ones of said plurality of spring elastic members to the outside (Fig. 1)". Applicant submits that FIG. 1 of Grange '997 illustrates aperture 62 in base member 52 accommodating or exposing first stem section 34 of rigid conductive member 30, not accommodating or exposing spring elastic members. Applicant submits that coil 20 is the only elastic member in Grange '997 and that coil 20 in Grange '997 is not exposed by windows in aperture 62. Because Grange '997 fails to meet the claim language of Applicant's claim 3, Applicant respectfully requests the removal of the 35 U.S.C. § 102 (b) rejection of Applicant's claim 3.

In Paper No. 7, in the rejection of claim 1, the Examiner submits that rigid conductive portion 30 of Grange '997 is merely an extension of contact portions of first circuit 12 in Grange '997. However, in the rejection of claim 3 in Paper No. 7, the Examiner submits that the same part, rigid conductive member 30 is merely an extension of coil 20 when the Examiner asserts that aperture 62 exposes coil 20. Applicant submits that this is inconsistent. Rigid conductive member 30 in Grange '997 cannot serve to be both a portion of TAB circuit 12 at the same time rigid conductive member 30 serves to be a portion of coil 20. It is kindly noted that claim 3 depends from claim 1 and that the examination of claim 3 must be consistent with the examination of claim 1. Withdrawal of the 35 U.S.C. § 102 (b) rejection of claim 3 is again respectfully requested.

Regarding claim 4, Applicant has amended claim 4 by replacing the word "soldering"

with --solder--. Applicant submits that this amendment overcomes the Examiner's reason for the rejection of the limitation posed in claim 4.

Applicant has newly added claims 19 and 20 to further distinguish Applicant's invention from Grange '997. In particular, claim 19 claims that elastic member in Applicant's invention comprises only a single bend where the entire elasticity of the elastic member is drawn from this single bend. In claim 20, Applicant claims that the elastic members are absent a coil spring and absent a rigid conductor. Applicant submits that none of these features are present in Grange '997.

A fee of \$110.00 is incurred by filing of a petition for a one month extension of time, set to expire on September 10, 2002. Applicant's check drawn to the order of Commissioner accompanies this Amendment. Should the check become lost, be deficient in payment, or should other fees be incurred, the Commissioner is authorized to charge Deposit Account No. 02-4943 of Applicant's undersigned attorney in the amount of such fees.

In view of the above, all claims are deemed to be allowable and this application is believed to be in condition to be passed to issue. Should any questions remain unresolved, the Examiner is requested to telephone Applicant's attorney.

Respectfully submitted,



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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION

Please amend paragraph 0021 of Applicant's specification to read as follows:

[0021] FIG. 3 illustrates printed circuit board (PCB) 124 disposed on a back side of carrier 120. Housing 140, which houses a plurality of elastic members 130, is disposed on said printed circuit board 124. The housing 140 is on a side of printed circuit board 124 that faces the front of carrier 120 so that members 130 mate with respective contact portions 12 of ink cartridge 10 when ink cartridge 10 is installed on carrier 120. Referring to FIGS. 3 and 4, a carrier 120 in which an ink cartridge 10 is installed to receive an output signal from the main board (not shown) of a computer and perform printing includes a printed circuit board 124 for transmitting and receiving the output signal . A flexible cable (not shown) is attached to one side of the printed circuit board 124 and connected to the main board. The printed circuit board 124 has a plurality of contact portions 126 via which an electrical signal is transmitted. A plurality of contact portions 12 for electrical connection are formed on one side of the ink cartridge 10 as described above.

IN THE CLAIMS

Please amend claims 4, 6 and 7, as follows, and newly add claims 19 and 20, as set forth above:

1 4. (Twice Amended) The apparatus of claim 1, one end of each one of a plurality of
2 bases being electrically connected to the printed circuit board by [soldering] solder to form one of

3 said plurality of second contacts.

1 6. (Amended) The [electrical contacting] apparatus [in an ink jet printer] of claim 5,
2 [wherein] the nickel [is] being formed to a thickness of 0.5 to 20 μm , and the gold [is] being
3 formed to a thickness of 0.1 μm or greater.

1 7. (Amended) The [electrical contacting] apparatus [in an ink jet printer] of claim [6] 5,
2 [wherein] the nickel [is] being formed to a thickness of 1.27 μm , and the gold [is] being formed
3 to a thickness of 0.3 μm .